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# FIELD CROPS

Cornell Cooperative Extension

IPM Integrated Pest Management

## Gray Garden Slug

*Deroceras reticultatum* (Muller)

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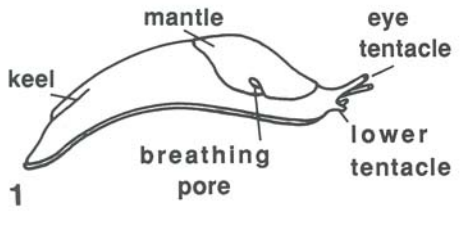
The gray garden slug was introduced from Europe during the 1800s. It has become a common pest of vegetables, field crops, and ornamentals throughout the United States and Canada. It is a close relative of the marsh slug, *Deroceras laeve* (Muller), and shares many aspects of its biology. Gray garden slugs attack seedlings of a number of crops, particularly no-tillage corn and alfalfa, and strawberries. Large numbers of slugs can be found in a wet year when the preceding winter was mild.

### Identification

A slug is often described as a snail without a shell, and its morphological features are shown in Figure 1. The head of the slug has two sets of tentacles. The eyes are on the tips of the upper tentacles. The lower tentacles, which are shorter, are used for tasting and smelling. The mouth is located between and below the lower tentacles, and is equipped with a radula, a tooth-covered rasp that the slug uses to grate plant tissue. The slug glides along a path of mucus that is secreted by the pedal gland, located just below the mouth. The mantle is a fold of skin on the back of the slug. At the edge of the mantle is an opening called the breathing pore, or respiratory pore, which can be seen opening and closing rhythmically as air passes in and out. The keel is a ridge down the back of some species of slugs.

The external features of the slug that are used for identification are size, color, skin texture, location of the mantle, position of the breathing pore, presence or absence of a keel, and the color of the mucus. The gray garden slug is about 5 cm (2 in.) long when fully grown (fig. 2). It is variably colored, ranging from cream colored with irregular gray spots to dark brown with dark spots. The mantle is situated forward, near the head, and the respiratory pore is behind the mid-point of the mantle. The keel is located only at the tail. The gray garden slug produces a milky slime when disturbed (fig. 3); this slime distinguishes it from other species, many of which produce clear slime.





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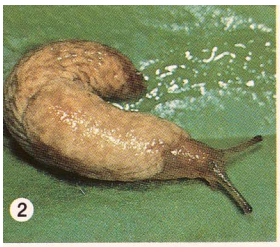



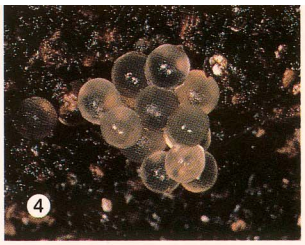



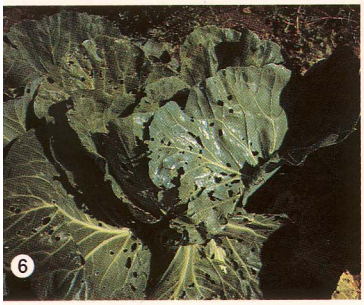



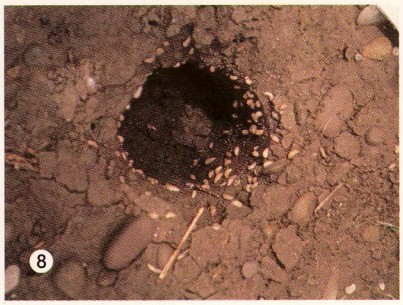



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## Biology

Slugs need a certain amount of dampness or humidity to survive. They are usually active at night or when it rains, and spend sunny days under logs, sticks, stones, or crop debris such as corn stalks. Many slugs are omnivorous; they may eat a variety of foods such as fungi, dead worms, or dead insects, in addition to green plants.

## Life Cycle

The gray garden slug mates throughout the warm months in most areas of the country. It is hermaphroditic, meaning that it has both male and female reproductive organs. An individual may start out as a male, then become both male and female, and finally become solely female. Certain species may even self-fertilize, which means they can produce viable offspring without mating. After mating, clusters of from eight to sixty clear jelly-like eggs are laid in sheltered areas on the ground (fig. 4). Newly hatched slugs resemble the adults, but are much smaller, as can be seen in Figure 5; part of the adult appears at the top of the photograph. The average life span of the gray garden slug is from nine to thirteen months and an adult can lay from 300 to 500 eggs during its lifetime. Because the eggs are very resistant to cold and drying, they are often the only life stage to overwinter. The adults can survive mild winters and winters where they are well sheltered in the ground.

## Damage

Slugs injure plants by chewing holes of various sizes in the leaves and stems. These holes may be in the middle of the leaf or on the edge. The early seedling stages are most susceptible to slugs; slugs can sometimes consume the entire seedling. Once the crop has passed the five-leaved stage, the damage is generally superficial.

Slug damage (fig. 6) may be confused with injury caused by caterpillars. Because slugs often feed at night, the only evidence of their presence may be glistening patches or streaks of dried slime seen on the plants and the ground nearby. If caterpillars are present, they can be seen during the day on plants and in soil cracks near the base of plants; caterpillar droppings can be found on crop leaves and on the ground.

## Sampling Methods

One way to sample slug populations in field crops is to dig holes 10 cm (4 in.) in diameter and 15 cm (6 in.) deep (a golf-hole digger works well) and cover them with asphalt shingles wrapped in aluminum foil (fig. 7). The reflective surface keeps the hole dark, cool, and moist – an ideal hiding place for slugs. Slugs exhibit homing behavior and a tendency to aggregate. They will return to a secure hiding place night after night and will also seek out other slugs. After several nights, the traps can be checked and the slugs counted (figure 8). More than five slugs per hole indicates that control might be warranted if each crop plant has less than five leaves. This sampling method is most accurate in open row crops such as corn; in crops like alfalfa, the slugs may tend to hide under the foliage.

Another way to sample for slugs is to remove soil samples of a fixed volume, wash them through a series of sieves, and look for both adults and eggs. This method is tedious and does not allow for continuous sampling at a single location. However, it yields an absolute count.

## Control

If the area is small – for example, a garden – removing shelter for the slugs can help to control them. The gardener should remove debris, logs, and stones, and trim grass and weeds along the edge of the garden. For high populations (more than five slugs per sampling hole), it may be necessary to remove slugs by hand from plants at night. Daytime collection is also possible if the gardener lays a “trap” of boards or shingles on the ground near the most susceptible plants. The slugs will crawl under the boards at night and can be crushed or removed in the morning.

Other methods of control are to search for egg masses and destroy them; to encircle the most susceptible plants with wood ashes, diatomaceous earth, or even screen to exclude slugs; and to encourage natural enemies of slugs – toads, garter snakes, and predacious ground beetles (fig. 9).

In field crops, avoid planting corn, alfalfa, beans, or other susceptible crops in wet fields where slugs have been a problem. Slug populations are often highest in fields that were in sod the previous year, or that had crop debris on the ground. If corn or alfalfa is to be planted following sod, plow as early as possible in the fall. If high populations of slugs are detected, till the soil or use a molluscicidal bait to prevent slug damage.

A molluscicidal bait is more effective than a chemical spray for controlling slugs in crops. The bait works best if applied in the evening when the ground is damp and slugs are active. Further information about molluscicides may be obtained from local Cooperative Extension agents.

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